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(54) **EEA ANVIL SNAP RING ACTIVATOR**

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See application file for complete search history.

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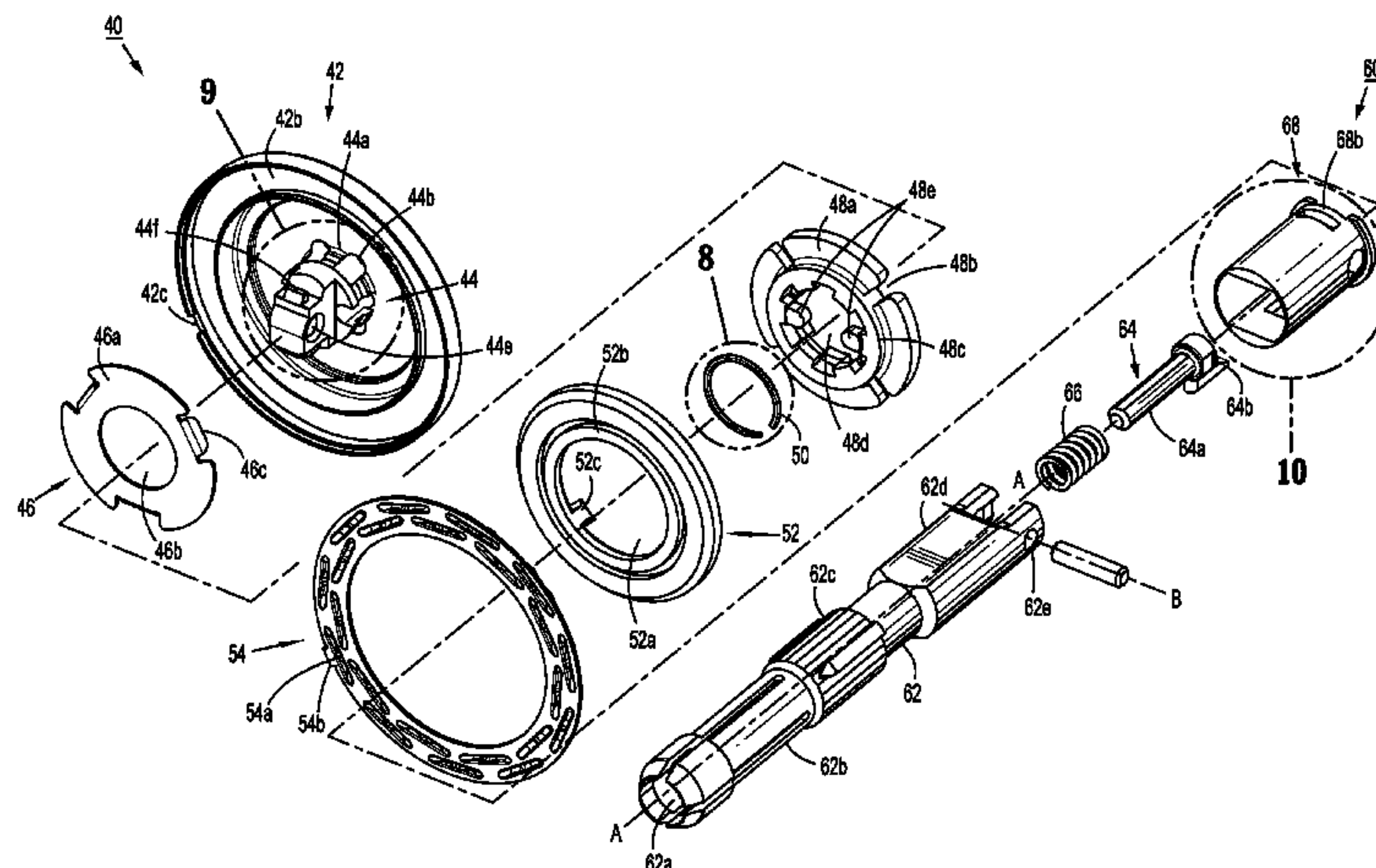
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ABSTRACT

A surgical fastening apparatus and associated method of use is disclosed. The surgical fastening apparatus includes a handle assembly, a central body portion extending from the handle assembly, and a distal head portion including an anvil head assembly. The anvil head assembly includes an anvil head defining an interior recess, an activator plate, a deformable member, and a securing member. The anvil center rod assembly defines a longitudinal axis and is pivotably connected to the anvil head assembly about a pivot axis. The anvil center rod assembly includes a configured to contact the anvil head assembly upon an actuation of the surgical fastening apparatus. Upon the actuation of the surgical fastening apparatus, the deformable member is configured to deform such that the activator plate is advanced distally into the interior recess to facilitate the anvil head pivoting about the pivot axis.

19 Claims, 10 Drawing Sheets



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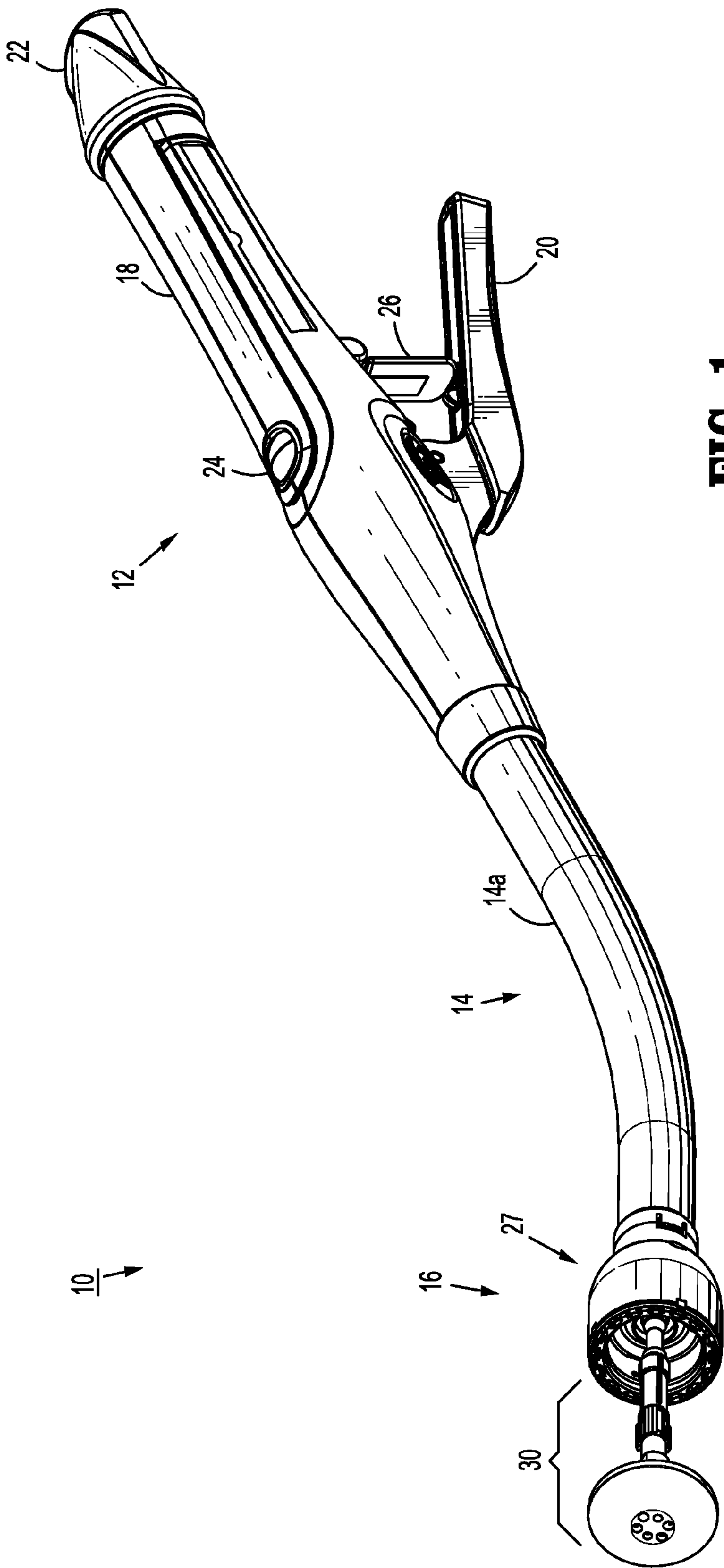
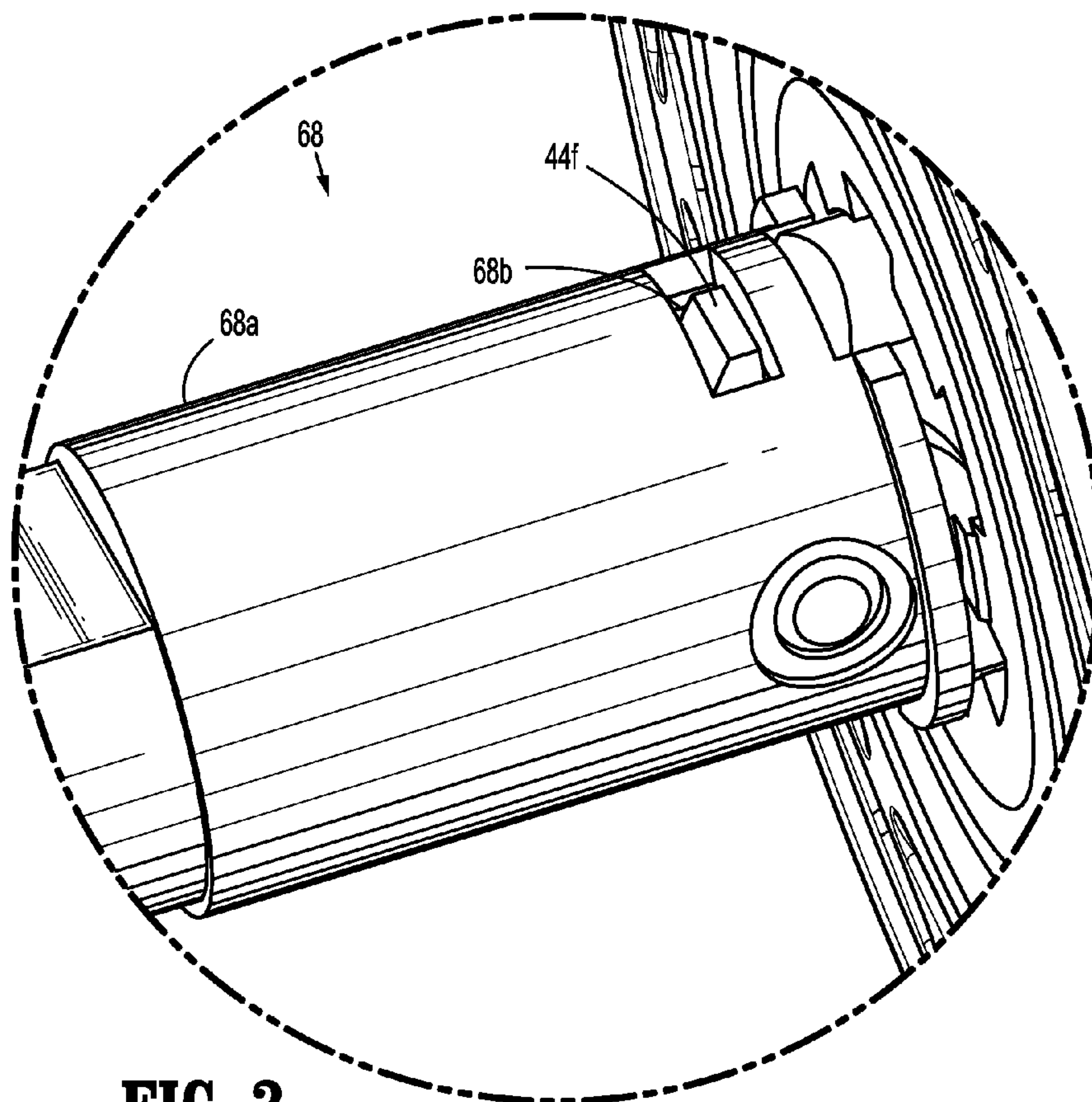
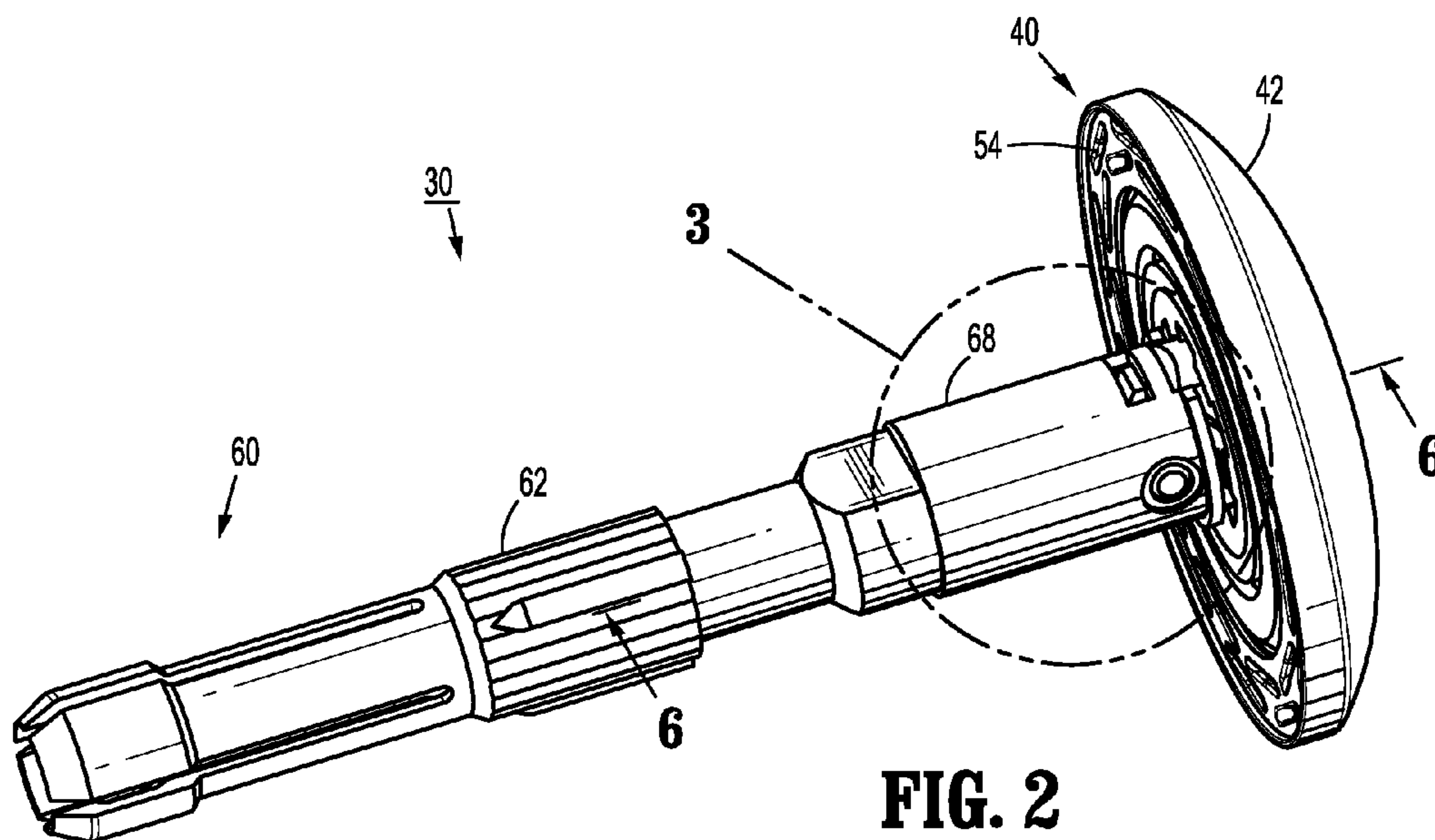
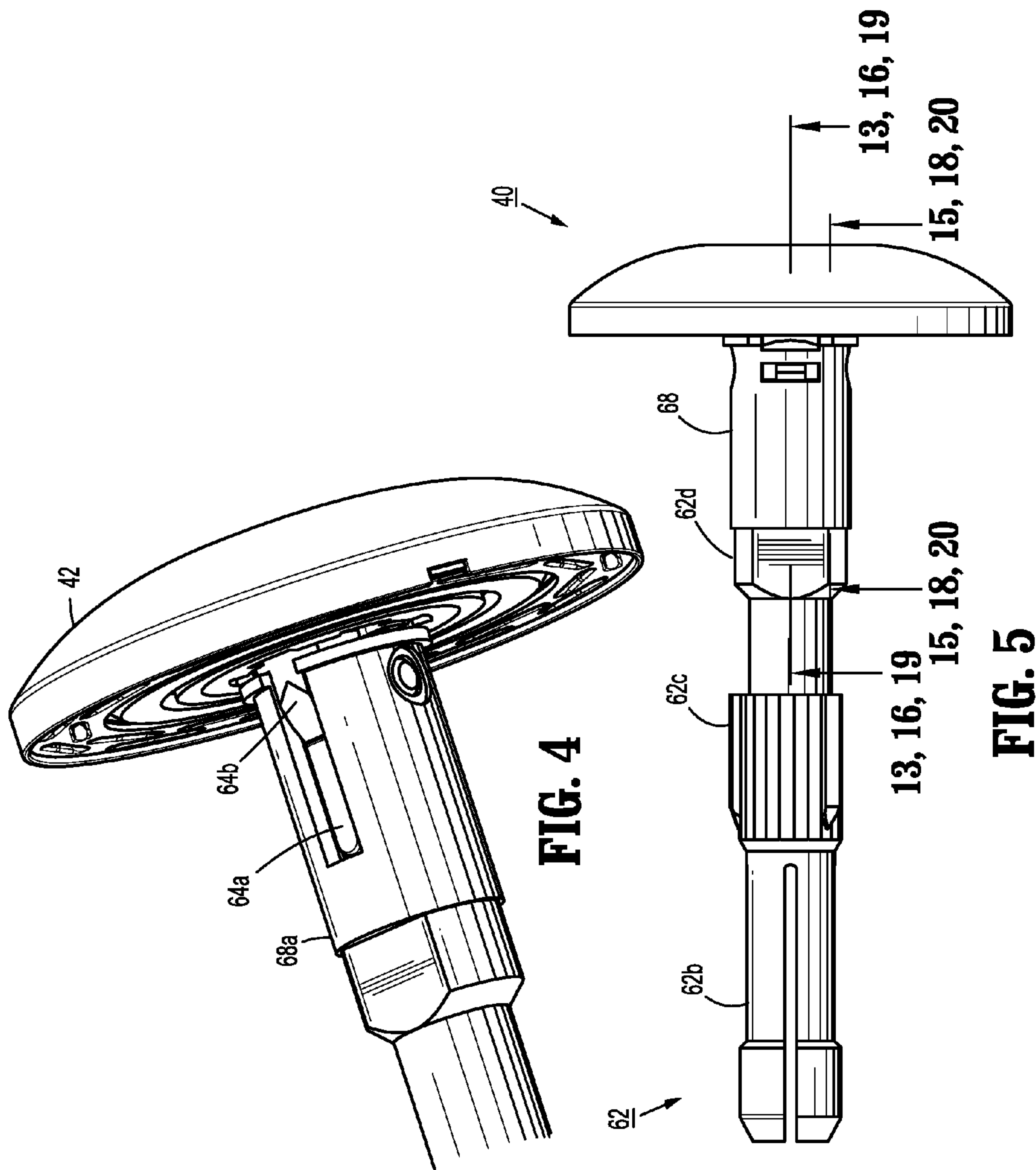


FIG. 1





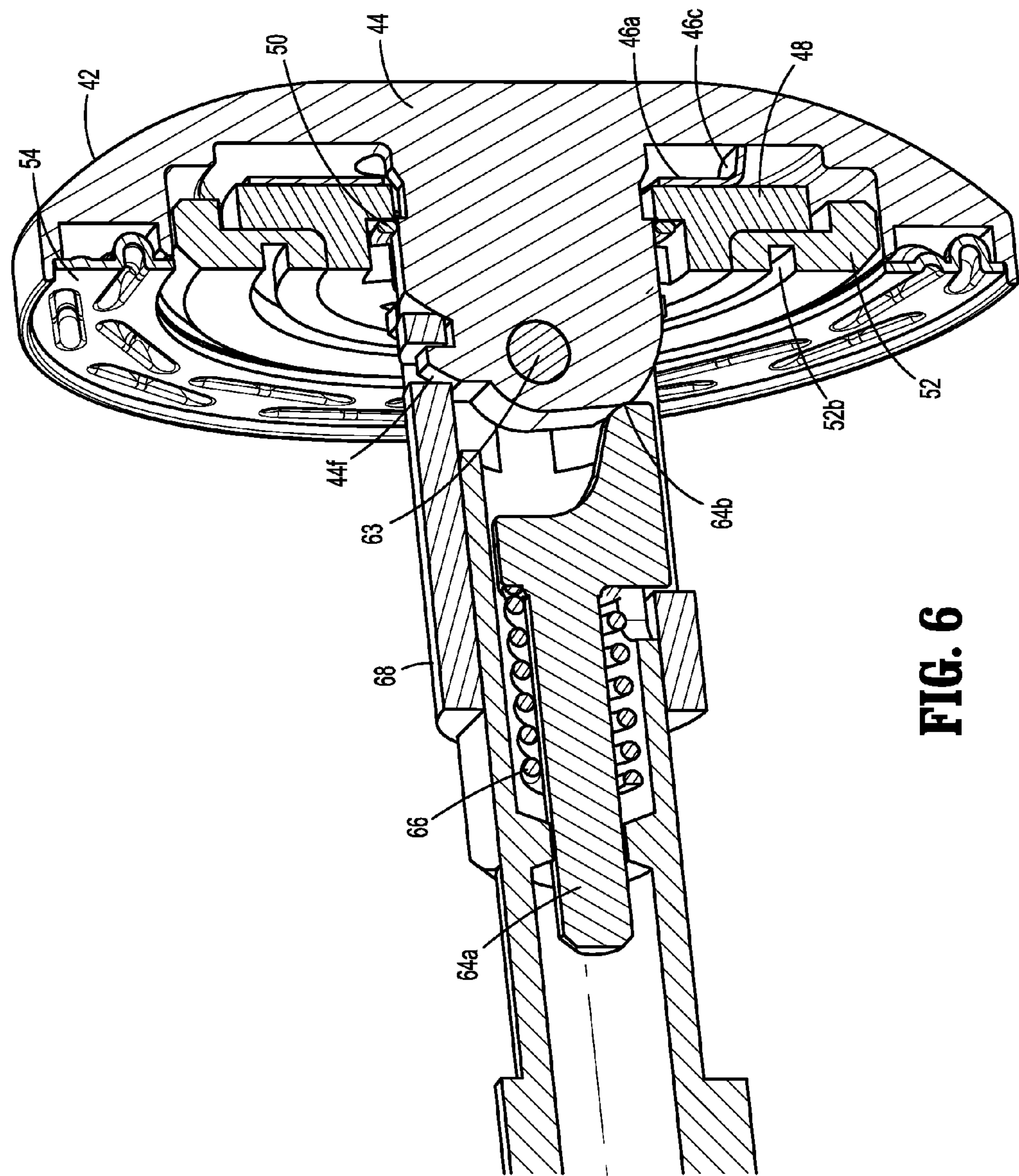


FIG. 6

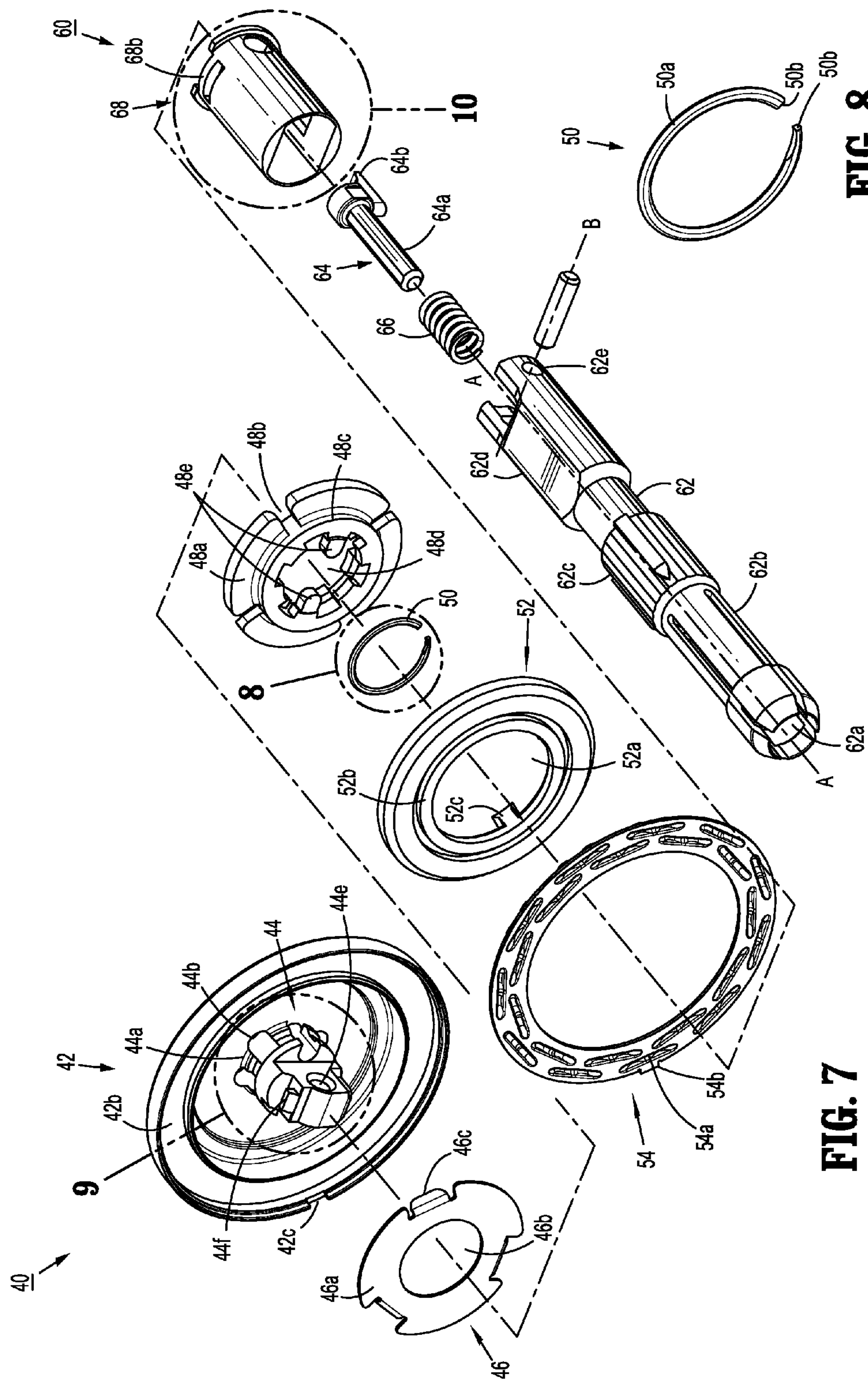
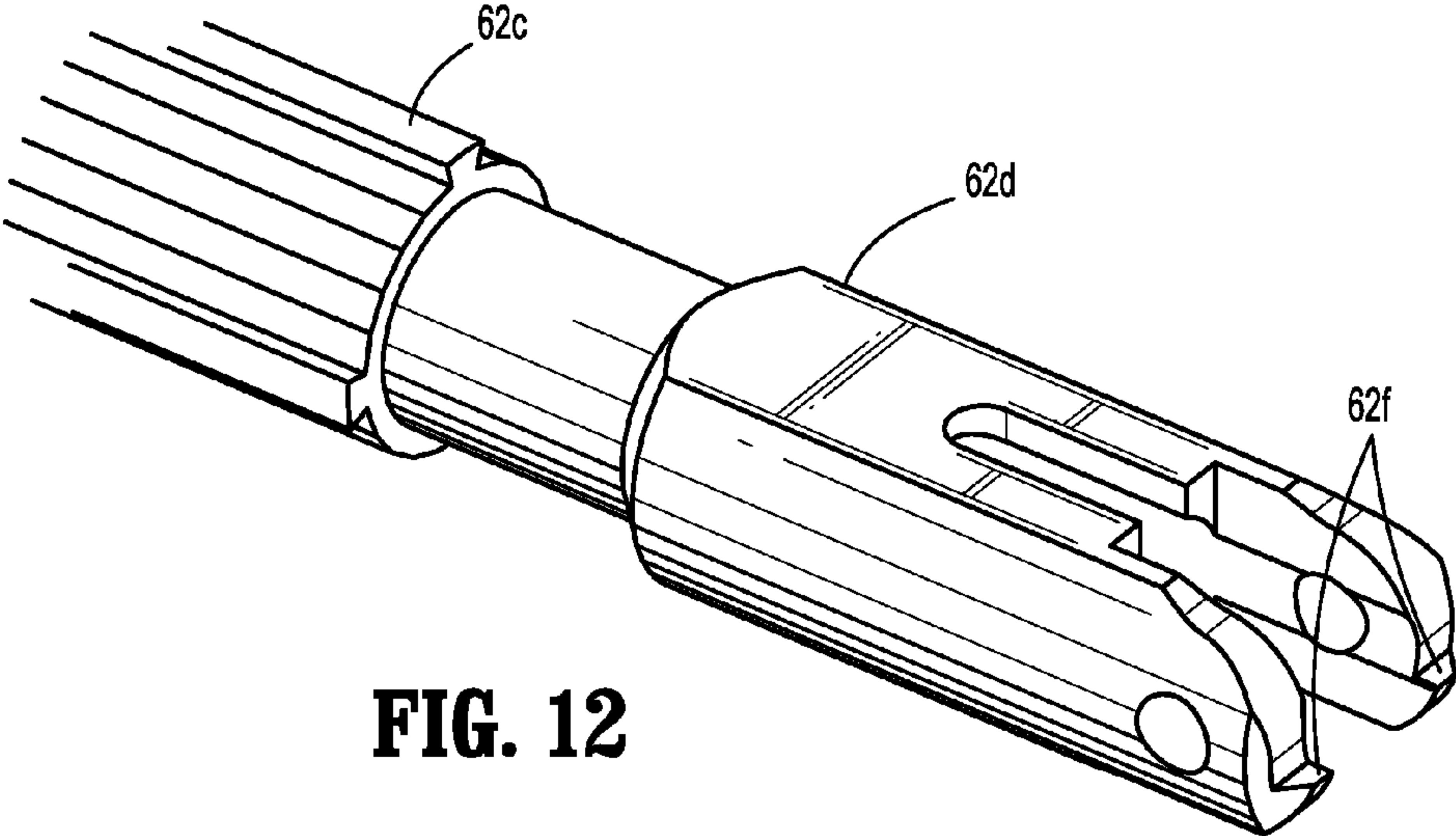
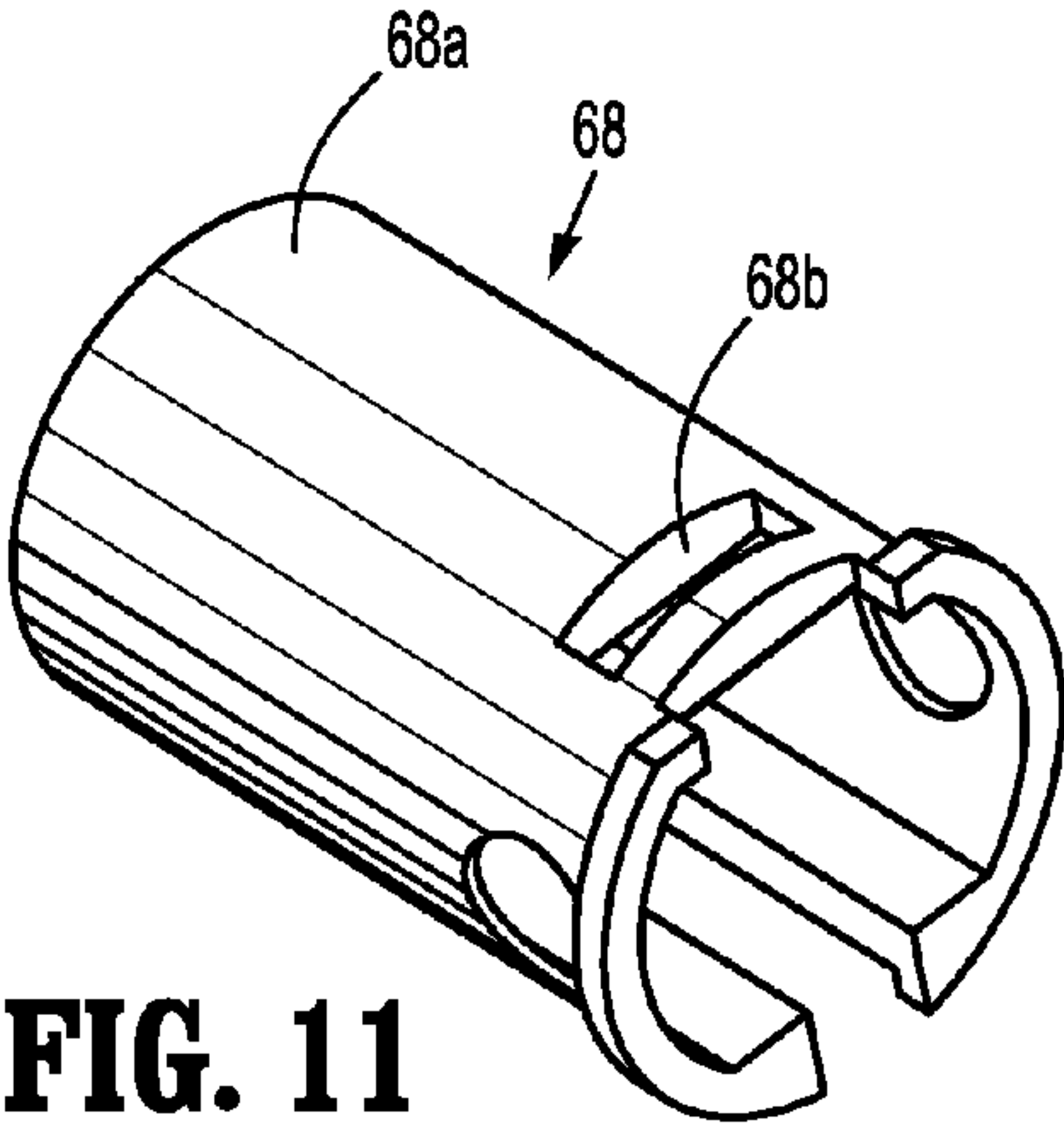
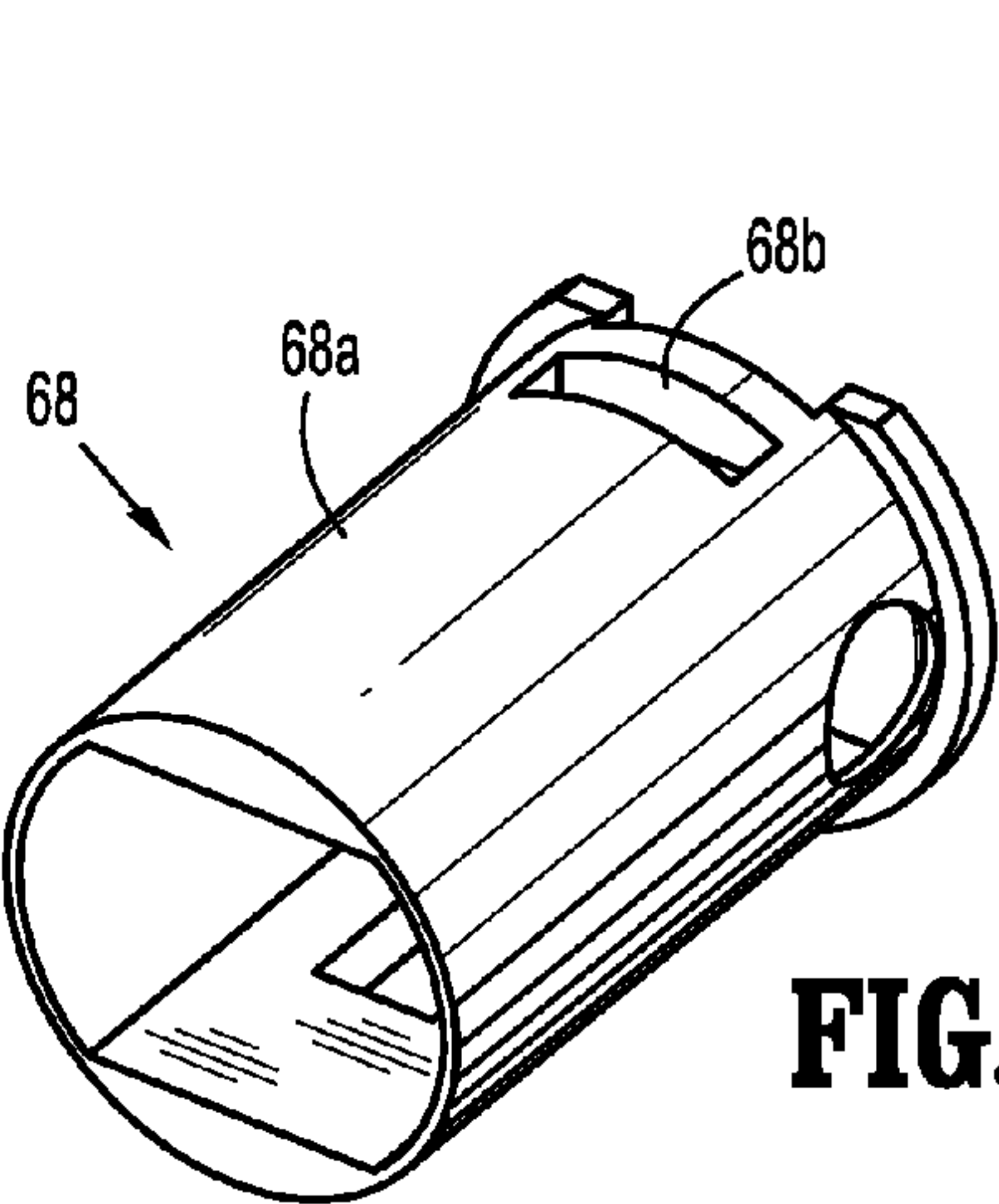
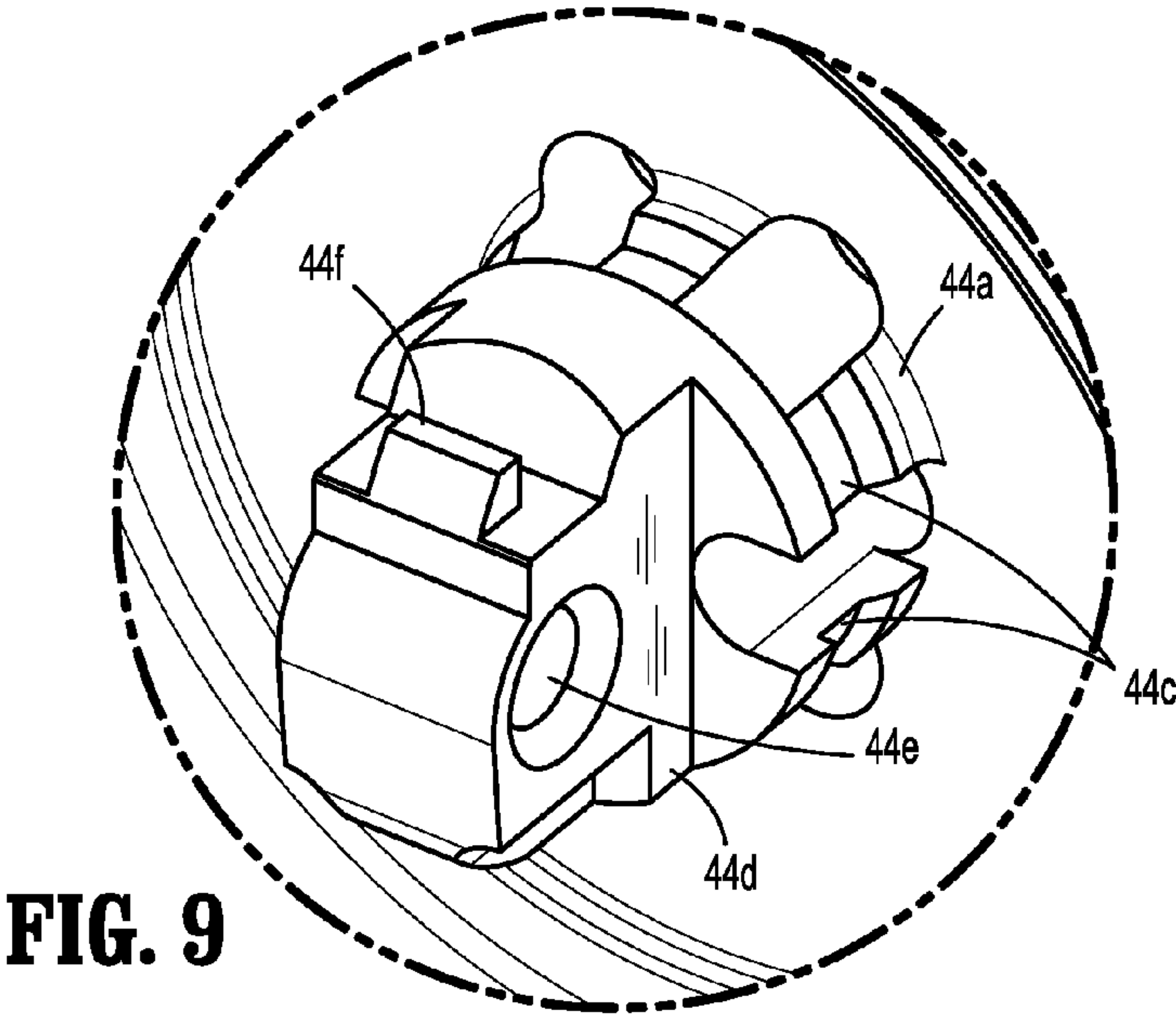


FIG. 8

FIG. 7



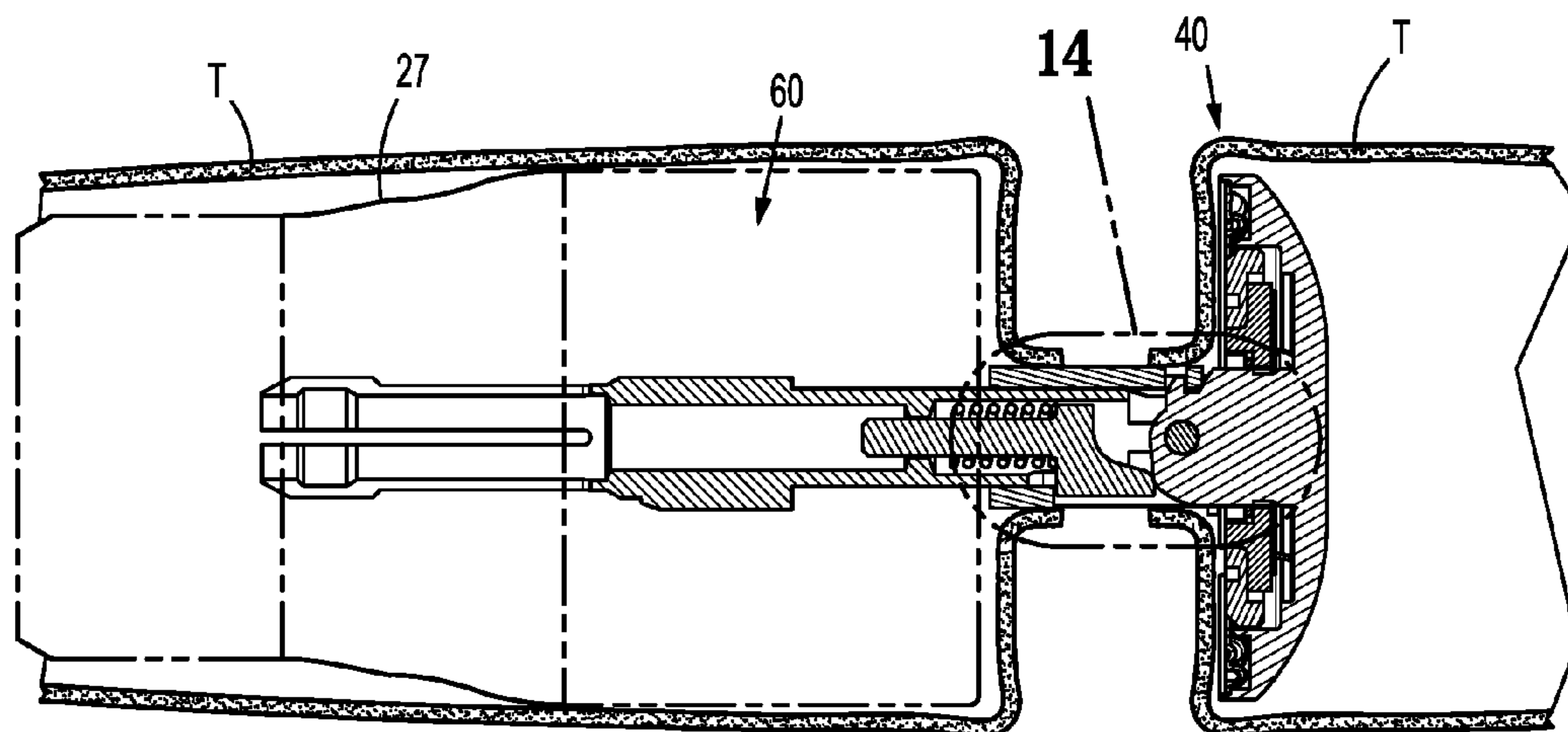


FIG. 13

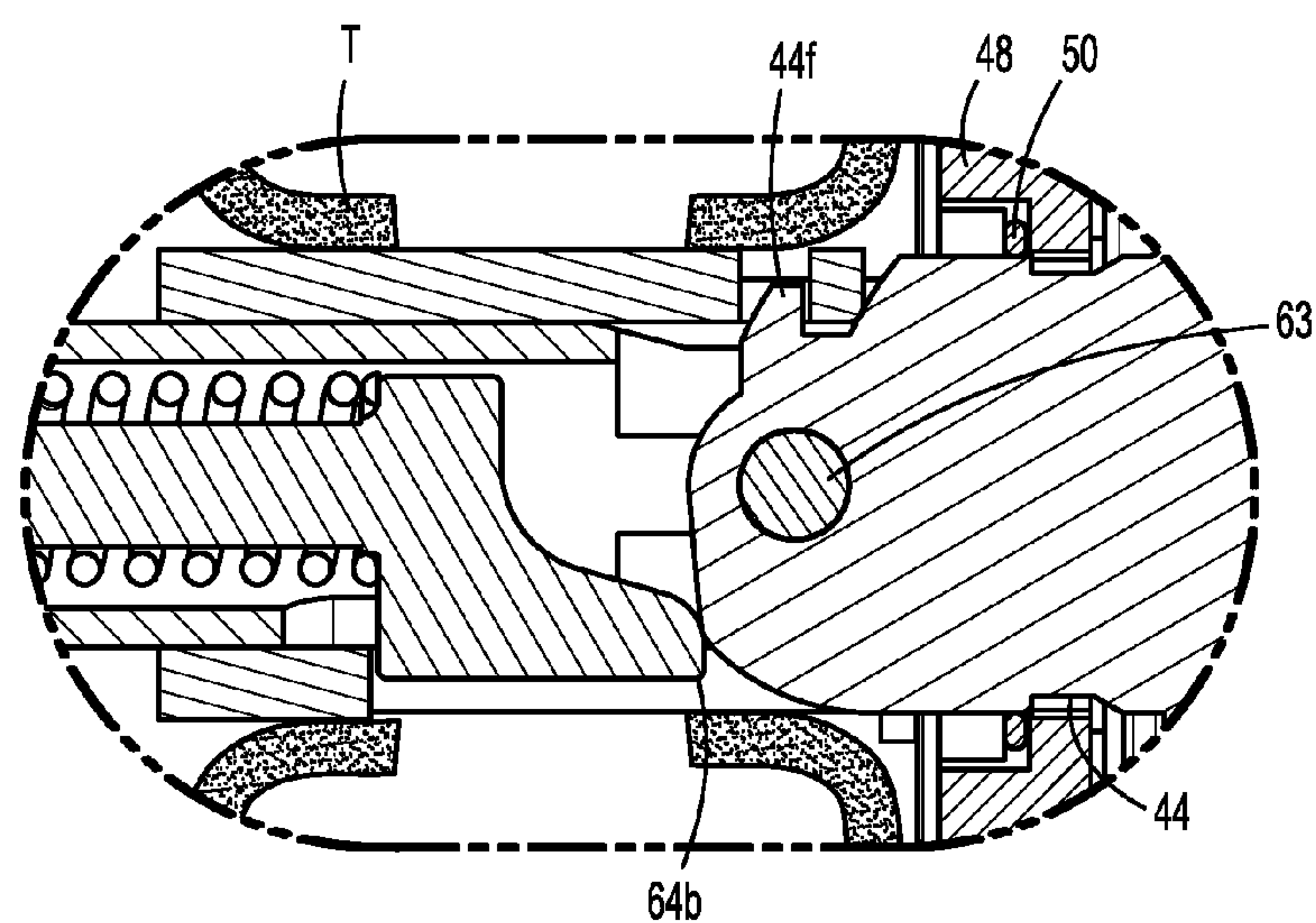


FIG. 14

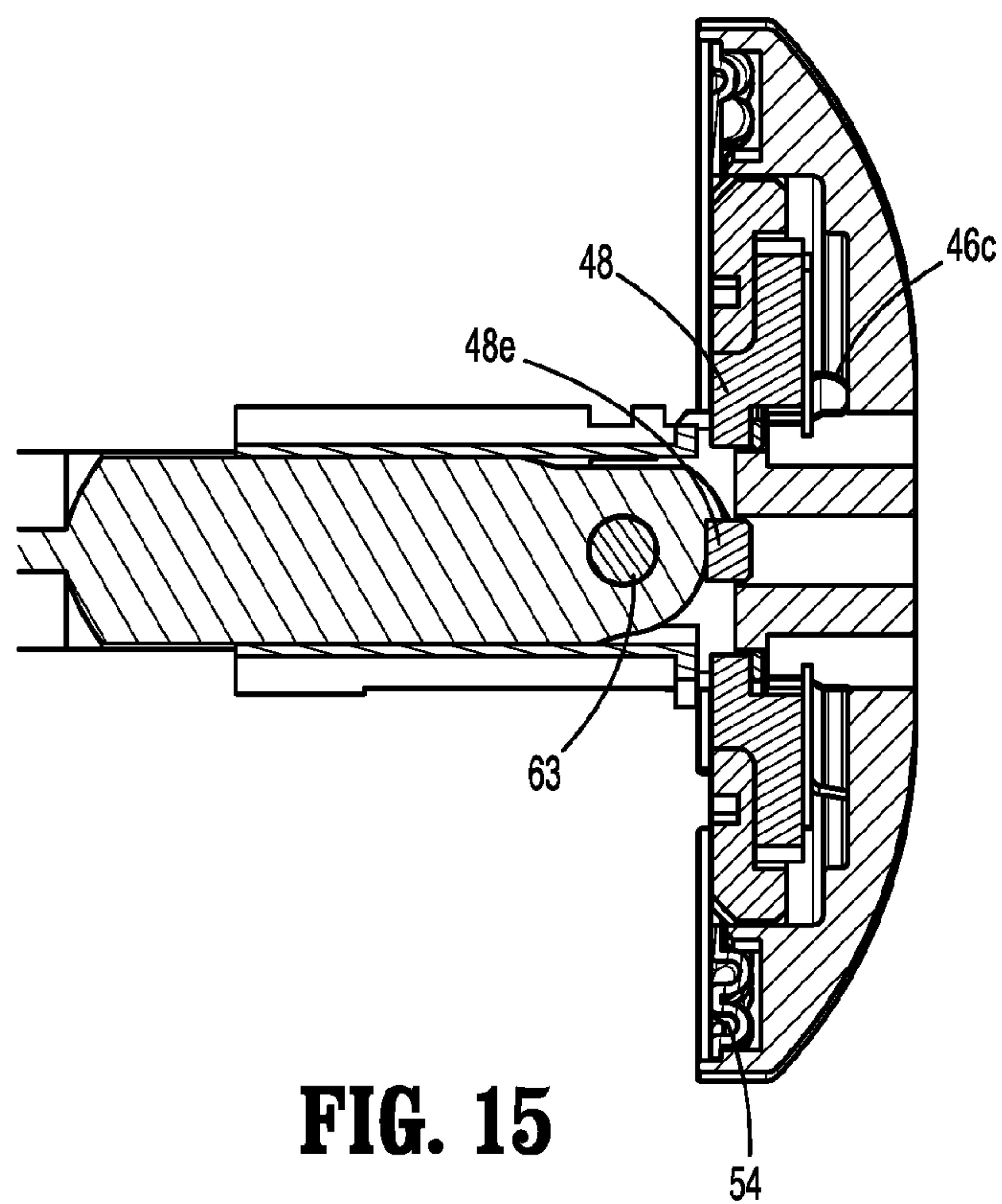


FIG. 15

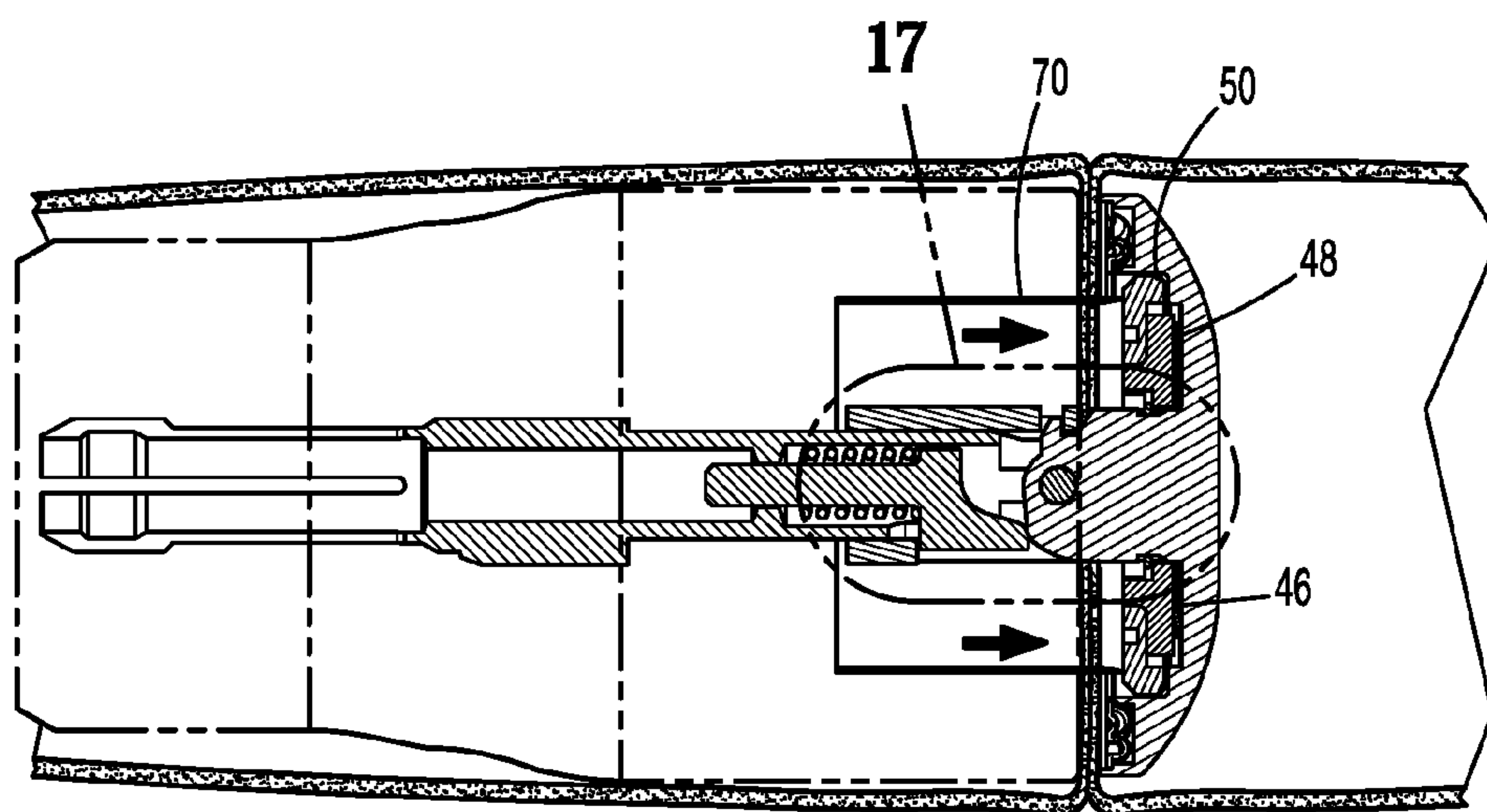


FIG. 16

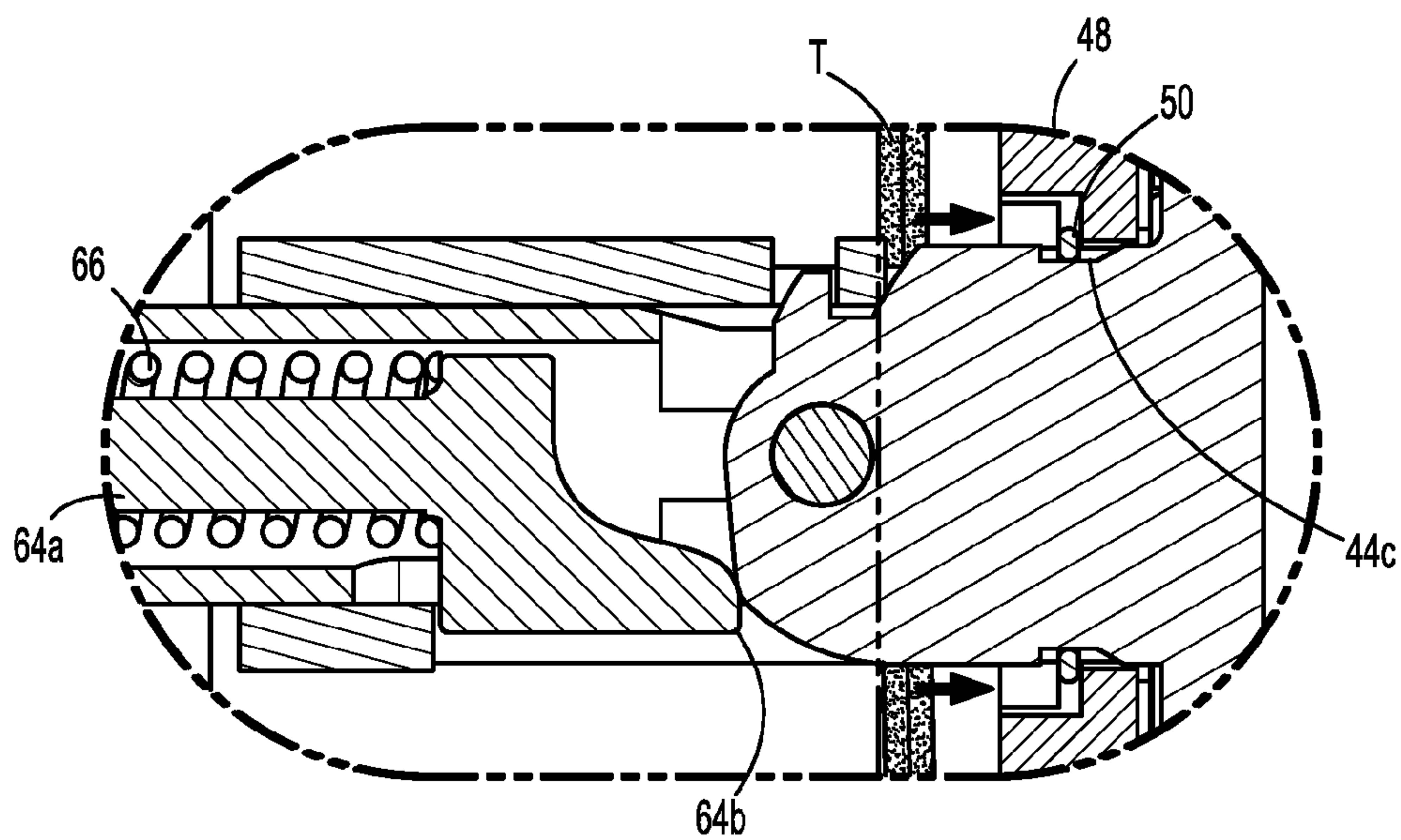


FIG. 17

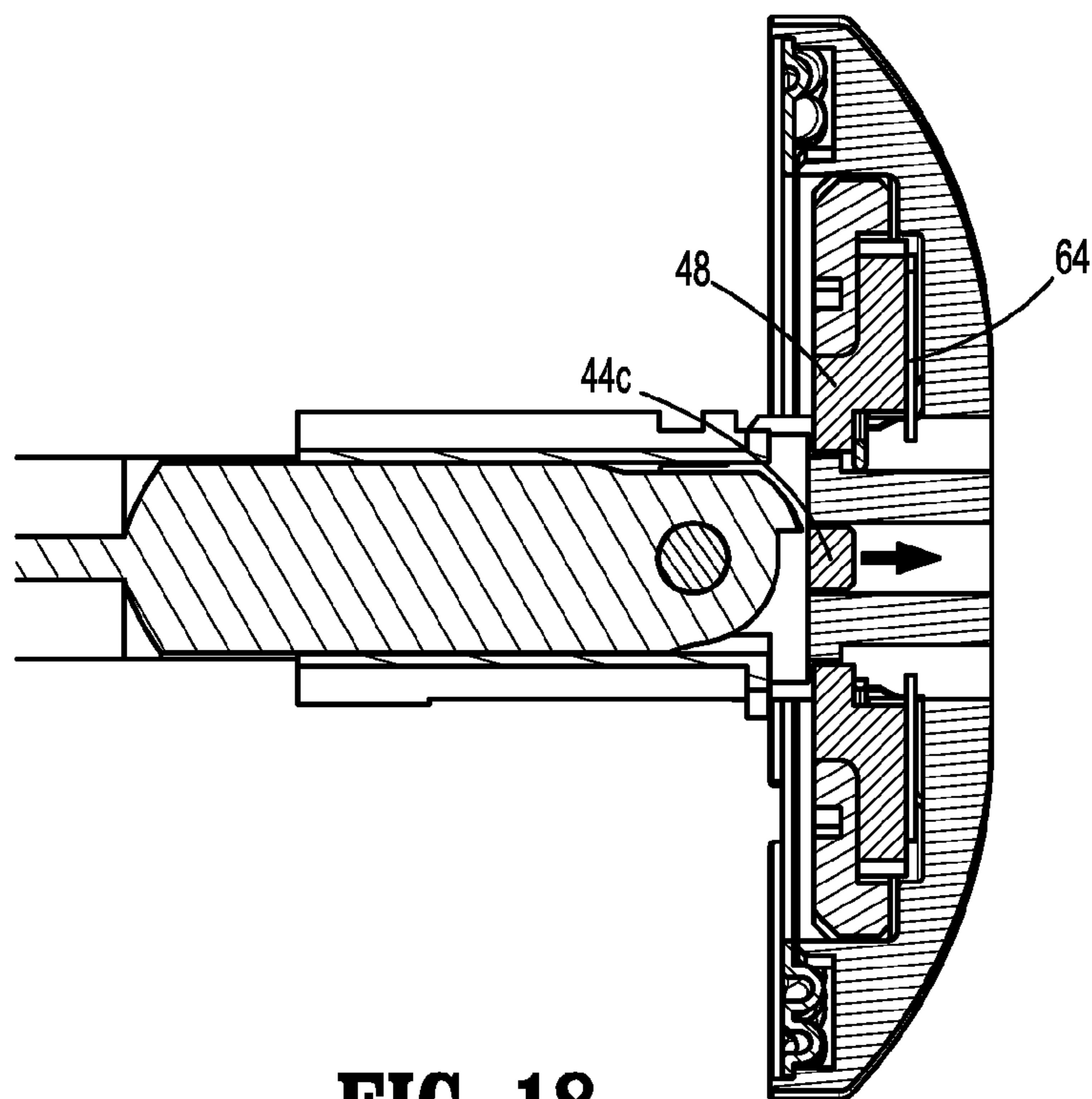


FIG. 18

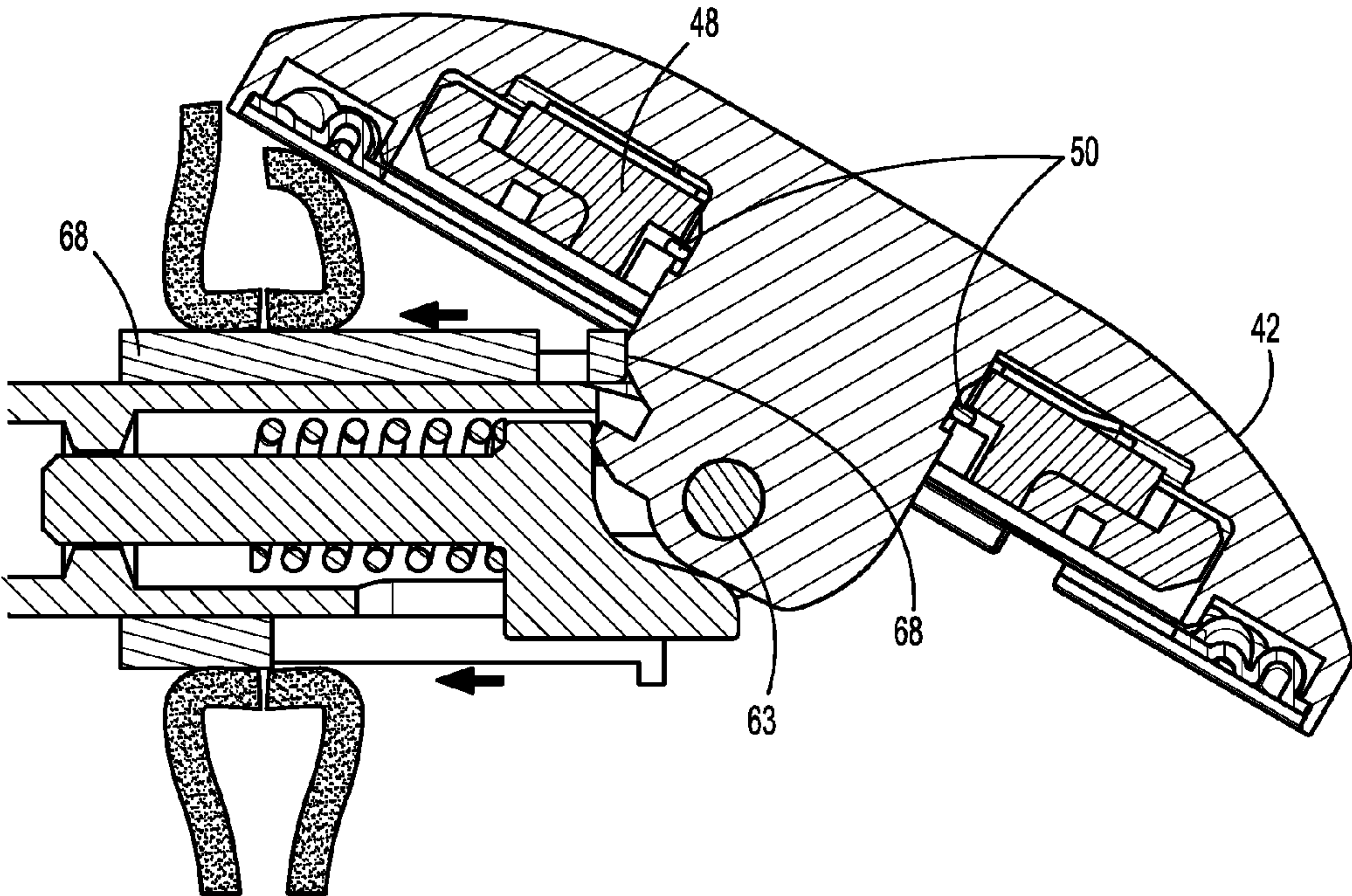


FIG. 19

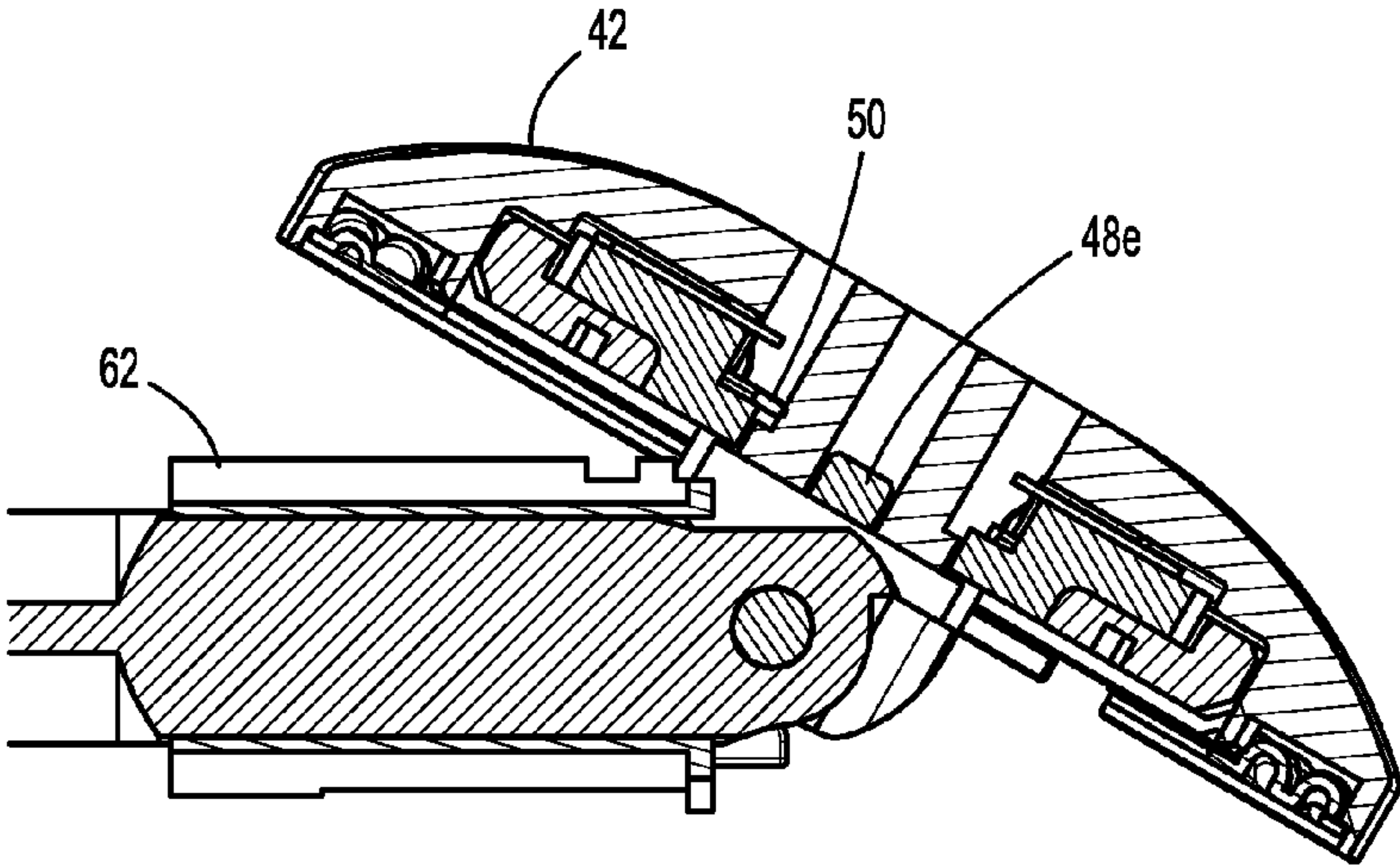


FIG. 20

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EEA ANVIL SNAP RING ACTIVATOR

BACKGROUND

1. Technical Field

The present disclosure relates generally to a surgical fastening device for applying surgical fasteners to body tissue. More particularly, the present disclosure relates to a surgical fastening device suitable for performing circular anastomosis and/or treatment to internal walls of hollow tissue organs.

2. Background of Related Art

Anastomosis is the surgical joining of separate hollow organ sections. Typically, an anastomosis procedure follows surgery in which a diseased or defective section of hollow tissue is removed and the remaining end sections are to be joined. Depending on the desired anastomosis procedure, the end sections may be joined by either circular, end-to-end or side-to-side organ reconstruction methods.

In a circular anastomosis procedure, the two ends of the organ sections are joined by means of a fastener instrument which drives a circular array of fasteners, e.g., staples, through the end section of each organ section and simultaneously cores any tissue interior of the driven circular array of staples to free the tubular passage. Examples of instruments for performing circular anastomosis of hollow organs are described in U.S. Pat. Nos. 6,053,390; 5,588,579; 5,119,983; 5,005,749; 4,646,745; 4,576,167; and 4,473,077, each of which is incorporated herein in its entirety by reference. Typically, these instruments include an elongated shaft having a handle portion at a proximal end to actuate the instrument and a fastener holding component disposed at a distal end. An anvil assembly including an anvil rod with attached anvil head is mounted to the distal end of the instrument adjacent the fastener holding component. Opposed end portions of tissue of the hollow organ(s) to be fastened are clamped between the anvil head and the fastener holding component. The clamped tissue is joined by driving one or more fasteners from the fastener holding component so that the ends of the fasteners pass through the tissue and are deformed by the anvil head. An annular knife is concurrently advanced to core tissue of the hollow organ to free a tubular passage within the organ.

In many surgical fastening devices for anastomosis procedures, the anvil assembly is configured such that the anvil head tilts or pivots relative to the anvil rod after a firing of the surgical fastening device to facilitate, e.g., removal or advancement of the surgical fastening device through tissue by presenting a smaller cross-sectional profile. However, given the close tolerances of the movable components of such a surgical fastening device, various movable components may interfere with the pivoting or tilting of the anvil head with respect to the anvil rod. Further, tissue surrounding the point of connection of the anvil head and anvil rod may interfere with the pivoting or tilting of the anvil head with respect to the anvil rod.

Accordingly, it would be desirable to provide a surgical fastening apparatus that is configured to secure components of the surgical fastening apparatus such that an anvil head may pivot freely with respect to an anvil rod. It would further be desirable to provide a surgical fastening apparatus configured to maintain tissue spaced away from the point of connection of an anvil rod and anvil head such that the anvil head may tilt or pivot freely with respect to the anvil rod.

SUMMARY

According to one aspect of the present disclosure, a surgical fastening apparatus is disclosed. The surgical fas-

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tening apparatus includes a handle assembly, a central body portion extending from the handle assembly, and a distal head portion. The distal head portion includes a shell assembly and an anvil assembly. The anvil assembly includes an anvil head assembly and an anvil center rod assembly. The anvil head assembly includes an anvil head defining an interior recess, an activator plate, a deformable member, and a securing member. The interior recess supports the activator plate, the deformable member is positioned distally of the activator plate, and the securing member is positioned proximally of the activator plate. The anvil center rod assembly defines a longitudinal axis and is pivotably connected to the anvil head assembly about a pivot axis. The anvil center rod assembly includes a plunger in mechanical communication with the anvil head. The plunger is configured to contact the anvil head assembly upon an actuation of the surgical fastening apparatus. Upon the actuation of the surgical fastening apparatus, the deformable member is configured to deform such that the activator plate is advanced distally into the interior recess to facilitate the anvil head pivoting about the pivot axis.

According to one aspect of the present disclosure, the anvil head includes a post extending proximally therefrom. According to another aspect of the present disclosure, the post may define an annular groove configured to securely receive the securing member. According to a further aspect of the present disclosure, the post may define an aperture therethrough, the aperture configured to align with a throughbore of the anvil center rod assembly. The aperture and the throughbore are configured to receive a pivot member therethrough to pivotably attach the anvil center rod assembly with the anvil head assembly.

In one aspect of the present disclosure, the deformable member includes a body and an extension extending therefrom. The extension may be configured to deform with respect to the body.

According to another aspect of the present disclosure, the pivot axis is transverse to the longitudinal axis. In another aspect of the present disclosure, the plunger is configured to engage the anvil head assembly at a location offset from the longitudinal axis. In yet another aspect of the present disclosure, the anvil head assembly includes a cut ring disposed in the interior recess. The cut ring may be configured to receive an annular knife upon the actuation of the surgical fastening apparatus.

In another aspect of the present disclosure, the anvil center rod assembly defines a ridge configured to inhibit the anvil head from pivoting about the pivot axis. In one aspect of the present disclosure, the ridge is configured to engage a lug extending from the activation plate. In another aspect of the present disclosure, upon the actuation of the surgical fastening apparatus, the lug may be configured to move away from the ridge to facilitate pivoting of the anvil head about the pivot axis.

According to another aspect of the present disclosure, the anvil center rod assembly includes a sleeve slidably disposed thereon. The sleeve may be configured to engage tissue. Further, the sleeve may be configured to slide proximally upon pivoting of the anvil head about the pivot axis.

According to another aspect of the present disclosure, a method of using a surgical fastening apparatus is disclosed, and includes providing an anvil center rod assembly and an anvil head assembly pivotably attached thereto. The method also includes actuating the surgical fastening apparatus such that an annular knife contacts a cut ring within the anvil head assembly. The method further includes advancing the annular knife distally such that the cut ring moves an activation

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plate and a deformable member distally of the cut ring, the deformable member having a body and an extension configured to deform relative to the body. The method also includes securing the activation plate with a securing ring such that the anvil head assembly pivots relative to the anvil center rod assembly. According to another aspect of the present disclosure, the method may also include pivoting the anvil head assembly relative to the anvil center rod assembly such that a smaller cross-sectional profile of the surgical fastening apparatus is created.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiment of the presently disclosed surgical stapling device are disclosed herein with reference to the drawings, wherein:

FIG. 1 is a perspective view of a surgical fastening apparatus according to the present disclosure;

FIG. 2 is a perspective view of an anvil assembly of the surgical fastening apparatus shown in FIG. 1;

FIG. 3 is an enlarged view of the area of detail identified in FIG. 2;

FIG. 4 is a perspective view of the distal portion of the anvil assembly shown in FIG. 2;

FIG. 5 is a side view of the anvil assembly shown in FIG. 2;

FIG. 6 is a cross-sectional view taken along section line 6-6 of FIG. 2;

FIG. 7 is a parts-separated view of the anvil assembly shown in FIG. 2;

FIG. 8 is an enlarged view of the area of detail identified in FIG. 7;

FIG. 9 is an enlarged view of the area of detail identified in FIG. 7;

FIG. 10 is a perspective view of a sleeve of the anvil assembly shown in FIG. 7;

FIG. 11 is another perspective view of the sleeve shown in FIG. 10;

FIG. 12 is a perspective view of the distal portion of the anvil center rod shown in FIG. 7;

FIG. 13 is a cross-sectional view taken along section line 13-13 of FIG. 5, inserted into and engaged with tissue;

FIG. 14 is an enlarged view of the area of detail identified in FIG. 13;

FIG. 15 is a cross-sectional view taken along section line 15-15 of FIG. 5;

FIG. 16 is a cross-sectional view taken along section line 16-16 of FIG. 5, inserted into and engaged with tissue;

FIG. 17 is an enlarged view of the area of detail identified in FIG. 17;

FIG. 18 is a cross-sectional view taken along section line 18-18 of FIG. 5, after a firing of the surgical fastening apparatus shown in FIG. 1;

FIG. 19 is a cross-sectional view taken along section line 19-19 of FIG. 5, inserted into and engaged with tissue, and with the anvil head being tilted relative to an anvil center rod; and

FIG. 20 is a cross-sectional view taken along section line 20-20 of FIG. 5, with the anvil head being tilted relative to an anvil center rod.

DETAILED DESCRIPTION

With reference now to the drawings wherein like numerals represent like elements throughout the several views, the presently-disclosed surgical fastening apparatus will be described. As used herein, the term “operator” may refer to

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any user, e.g., a nurse, doctor, or clinician, of the presently-disclosed surgical fastening apparatus. Further, the term “distal” refers to that portion of the surgical fastening apparatus, or component thereof, further from the operator while the term “proximal” refers to that portion of the surgical fastening apparatus, or component thereof, closer to the operator.

Referring initially to FIG. 1, an embodiment of the presently disclosed surgical fastening apparatus is illustrated generally as 10. Briefly, surgical fastening apparatus 10 includes a proximal handle assembly 12, an elongated central body portion 14 including a curved elongated outer tube 14a, and a distal head portion 16. Distal head portion 16 includes a shell assembly 27 and an anvil assembly 30, as will be described further below. In some embodiments, the length, shape and/or the diameter of body portion 14 and head portion 16 may also be varied to suit a particular surgical procedure.

Handle assembly 12 includes a stationary handle 18, a firing trigger 20, a rotatable approximation knob 22 and an indicator 24. Stationary handle 18 may be formed from separate handle sections (not shown), which together define a housing for the internal components of surgical fastening apparatus 10. A pivotally mounted trigger lock 26 is fastened to handle assembly 12 and is manually positioned to prevent inadvertent firing or actuation of surgical fastening apparatus 10. Indicator 24 is positioned on the stationary handle 18 and includes indicia, e.g., color coding, alpha-numeric labeling, etc., to identify to an operator whether the surgical fastening apparatus 10 has been fired or actuated and/or when the surgical fastening apparatus 10 is ready to be fired.

Referring to FIGS. 2-12, anvil assembly 30 includes an anvil head assembly 40 and an anvil center rod assembly 60 (best shown in FIG. 7). Anvil head assembly 40 is pivotally coupled with anvil center rod assembly 60, as will be described further below. Anvil head assembly 40 includes, from distal to proximal, an anvil head 42, a deformable member 46, an activation plate 48, a securing ring 50, a cut ring 52, and an anvil 54.

Anvil head 42 defines a curvate outer surface and an interior recess 42a defined by the curvate outer surface. An outer annular ledge 42b is defined along the outer periphery of the interior recess 42a. A post 44 is centrally positioned within the interior recess 42a defined by the anvil head 42. Post 44 protrudes proximally from the interior recess 42a defined by the anvil head 42 and defines a base 44a having a pair of notches 44b formed radially inwardly thereon, and an annular groove 44c formed therearound. Annular groove 44c is located proximally above the notches 44b in the base 44a of post 44. Post 44 also includes a coupling portion 44d having an aperture 44e therethrough and a tooth 44f extending therefrom for coupling with the anvil center rod assembly 60, as will be described further below.

Deformable member 46 includes a body 46a having a substantially annular configuration and defining a central opening 46b therethrough. One or more extensions 46c protrude radially outward and distally from the body 46a, and are configured for movement relative to the body 46a. Accordingly, extensions 46c may be formed of a different material than body 46a, e.g., a material with different (greater or lesser) flexibility, or may be pivotally attached to body 46a, e.g., via a living hinge. Deformable member 46 is configured to sit within the interior recess 42a of anvil head 42, with the extensions 46c contacting the distal surface of the interior recess 42a and spacing the body 46a thereabove.

Activation plate 48 is configured for disposition within the interior recess 42a of anvil head 42 proximally abutting

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the body 46a of deformable member 46. Activation plate 48 includes a substantially circular base portion 48a which defines one or more cutouts 48b formed along an outer periphery thereof. A raised platform 48c protrudes proximally from the base portion 48a of the activation plate 48, and defines a central opening 48d which is positioned about post 44 within the interior recess 42a of anvil head 42 between post 44 and annular outer ledge 42b. A pair of diametrically opposed lugs 48e extends radially inwardly into central opening 48d. Lugs 48e engage a portion of anvil center rod assembly 60, as will be described further below.

Securing ring 50 has a body 50a having substantially annular configuration and may include a discontinuity in its outer circumference. The discontinuity in the outer circumference of securing ring 50 may be defined by a pair of tapered ends 50b of the body 50a. Securing ring 50a is configured to sit proximally above the activation plate 48, and is configured to engage the annular groove 44c of the post 44 of anvil head 42, as will be described further below.

Cut ring 52 has a substantially circular configuration and defines an opening 52a having a larger diameter but substantially similar configuration as the outer circumference of the raised platform 48c of activation plate 48. In this manner, cut ring 52 is configured to fit over the raised platform 48c of activation plate 48 to concentrically and radially fix cut ring 52 on activation plate 48. Cut ring 52 defines an annular groove 52b positioned radially between the outer circumference of the cut ring 52 and the opening 52a. A tab 52c protrudes distally from the cut ring 52 and is configured to align with one of the cutouts 48b formed in the base portion 48a of the activation plate 48 to concentrically and radially fix the cut ring 52 about the activator plate 48 such that relative rotational movement between the cut ring 52 and activation plate 48 is inhibited. In one embodiment, cut ring 52 is formed from polyethylene and is fixedly secured to activation plate 48 using, for example, an adhesive. Activation plate 48 may be formed from a different, e.g., harder material such as a metal. Alternately other materials of construction may be used to construct activation plate 48 and cut ring 52. Cut ring 52 and activation plate 48 are slidably mounted about post 44.

Anvil 54 is a substantially annular member configured to be supported on the outer annular ledge 42b of anvil head 42 and includes a plurality of pockets 54a for receiving and deforming surgical fasteners, e.g., surgical staples (not shown). At least one tab 54b extends radially outwardly from anvil 54 and is dimensioned to be received within a cutout 42c formed along the outer periphery of anvil head 42. Tab 54b and cutout 44c interengage to align anvil 54 within outer annular ledge 44b of anvil head 42 and to inhibit rotation of anvil 52 with respect to anvil head 42 and vice versa.

Anvil center rod assembly 60 includes anvil center rod 62, a pivot member 63, a plunger 64, a plunger spring 66, and a sleeve 68. Anvil center rod 62 is a substantially elongate, cylindrical member defining a longitudinal axis "A" and a lumen 62a extending therethrough. Anvil center rod 62 defines a proximal portion 62b, a central portion 62c, and a distal portion 62d. The distal portion 62d of anvil center rod 62 defines a transverse throughbore 62e, which extends through the distal portion 62d transverse to and laterally spaced from the longitudinal axis "A". The aperture 44e of the post 44 of anvil head 42 aligns with the throughbore 62e to receive a pivot member 63 therethrough. Pivot member 63 is a cylindrical member configured for insertion through the throughbore 62e of anvil center rod 62 and aperture 44e of post 44 and defines a pivot axis "B" such that the anvil head

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42 may pivot about pivot axis "B" relative to anvil center rod 62. Pivot axis "B" may be transverse to longitudinal axis "A." Accordingly, pivot member 63 may be formed of a rigid material configured to withstand torsional and/or axial loading, e.g., metal or composite.

Plunger 64 is a substantially elongate member slidably positioned in the lumen 62a formed axially through the center rod 62. Plunger 64 includes a body 64a and an engagement finger 64b protruding distally from the body. Engagement finger 64b is offset from the pivot axis "B" of anvil head 42 and biased into engagement with the base portion 44a of post 44 by plunger spring 66. Plunger spring 66 is compressibly disposed in the lumen 62a of center rod 62a proximally abutting the plunger 64 such that the plunger spring 66 maintains a consistent distal bias against the plunger spring 66. Because the engagement finger 64b of the plunger 64 contacts the post 44 at a location laterally spaced from the longitudinal axis "A," the portion of the post 44 between the point of contact of plunger 64 and the pivot axis "B" acts as a moment arm such that the anvil head 42 is normally biased to pivot or tilt relative to the anvil center rod 62 about the pivot axis "B."

Sleeve 68 is a substantially cylindrical member having a body 68a defining an aperture 68b toward a distal end thereof. Sleeve 68 is slidably disposed along the outer surface about the anvil center rod 62. In a pre-fired or unactuated position, sleeve 68 is disposed about the distal portion 62d of the anvil center rod 62 such that the tooth 44f of the post 44 of anvil head 42 protrudes through the aperture 68b of the sleeve 68. In this manner, sleeve 68 fixes the anvil center rod assembly 60 and anvil head assembly 40 in the unactuated position. Sleeve 68 is configured to engage and move tissue during operation of the surgical fastening apparatus 10, as will be described further below.

In a pre-fired or unactuated position, lugs 48e formed on activation plate 48 engage a respective pair of ridges 62f protruding distally from the distal portion 62d of anvil center rod 62. In this manner, the interengagement of lugs 48e with ridges 62f of anvil center rod 62 inhibits the anvil head 42 from pivoting with respect to the anvil center rod 62. Accordingly, lugs 48e function to lock the anvil head 42 in the unactuated or pre-fired position. The interengagement of sleeve 68 and post 44 of anvil head 42 as described above also functions to lock the anvil head 42 in the pre-fired or unactuated position.

It will be understood that the various components of surgical apparatus 10 described herein may be formed of any suitable material for their intended purposes, e.g., metal, composite, and/or polymeric materials.

Referring now to FIGS. 13, 14, and 16, surgical fastening apparatus 10 may be inserted into a body cavity, e.g., through an incision or a naturally-occurring orifice such that the distal head portion 16 of surgical fastening apparatus 10 is positioned to engage adjacent sections of tissue T. The distal head portion 16 of surgical fastening apparatus 10 is positioned such that adjacent sections of tissue T are disposed between the shell assembly 27 and the anvil head assembly 40, with the anvil center rod assembly 60 extending therebetween. An operator may then rotate approximation knob 22 (FIG. 1) to approximate anvil head assembly 40 toward shell assembly 27. An operator may then engage firing trigger 20 (FIG. 1) to effect one or more firing strokes of surgical fastener apparatus 10. Upon a firing stroke of the surgical fastening apparatus 10, a plurality of fasteners, e.g., staples (not shown), are ejected from shell assembly 27 into the pockets 54a anvil 54. Upon another firing stroke of the surgical fastening apparatus 10, an annular knife 70 (shown

in phantom) is advanced distally through tissue T and into the annular groove 52c of cut ring 52. Cut ring 52 is accordingly forced distally against the activation plate 48, which causes the deformable member 46 to deform. Specifically, the extensions 46c of the deformable member 46 are caused to deform, i.e., extensions 46c bend, fold, crush, and/or flex such that the body 46b of deformable member 46, and the activation plate 48 and securing ring 50 disposed thereabove, shift deeper distally into the interior recess 42a of anvil head 42.

As the securing ring 50 moves distally, the body 50a of securing ring 50 engages the annular groove 44c of post 44 of anvil head 50. Securing ring 50 is configured to “snap” or otherwise lock into annular groove 44c such that securing ring 50 remains substantially axially stationary about post 44. Tapered ends 50b of securing ring 50 may aid in the transition of the securing ring 50 into the annular groove 44c. As the body 50a of securing ring 50 protrudes radially outward from the annular groove 44c of post 44, the body 50a maintains the activation plate 48 at a location distally of the annular groove 44c along post 44.

Further, as the activation plate 48 moves distally, the lugs 48e of activation plate 48 disengage from the ridges 62f of anvil center rod 62 such that anvil head 42 is free to pivot or tilt relative to anvil center rod 62 under the spring bias of plunger spring 64. As the anvil head 42 pivots about the pivot axis “B,” the tooth 44f of post 44 swings radially inward and disengages from the aperture 68e of sleeve 68. Accordingly, as one side of the anvil head 42 pivots or tilts proximally, the anvil head 42 engages the sleeve 68 and cams the sleeve 68 proximally along the anvil center rod 62.

Because the activation plate 48 is maintained distally below the annular groove 44c of post 44, the lugs 48e of activation plate 48e remain spaced from the ridges 62f of anvil center rod 62. In this manner, the securing ring 50 functions to inhibit the activation plate 48 from undesirably migrating proximally such that the lugs 48e of activation plate 48 re-engage ridges 62f of the anvil center rod 62. Further, because the sleeve 68 is engaged with surrounding tissue “T,” proximal movement of the sleeve 68 carries tissue “T” disposed thereon proximally. In this manner, tissue T is carried away from the pivot axis “B” during tilting of the anvil head 42 such that tilting of the anvil head 42 relative to the anvil center rod 62 is uninhibited by tissue “T.” Thus, surgical fastening apparatus 10 is configured such that anvil head 42 tilts uninhibited through a maximum degree of pivoting such that the transverse profile of surgical fastening apparatus 10 is reduced, e.g., for removal through an incision or naturally-occurring orifice or for advancement through a body cavity.

It will be understood that various modifications may be made to the embodiments disclosed herein. Therefore, the above description should not be construed as limiting, but merely as exemplifications of disclosed embodiments. Those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto.

The invention claimed is:

1. A surgical fastening apparatus, comprising:

a handle assembly;

a central body portion extending from the handle assembly; and

a distal head portion including a shell assembly and an anvil assembly, the anvil assembly including:

an anvil head assembly including an anvil head defining an interior recess supporting an activator plate, a deformable member positioned distally of the activator plate, and a securing member positioned prox-

mally of the activator plate, the anvil head having a post extending proximally therefrom; and
an anvil center rod assembly defining a longitudinal axis, the anvil head being pivotably connected to the anvil center rod assembly about a pivot axis, the anvil center rod assembly including a plunger in mechanical communication with the anvil head, the plunger configured to contact the anvil head assembly upon actuation of the handle assembly to cause pivoting of the anvil head about the pivot axis;

wherein, upon actuation of the handle assembly, the deformable member is configured to deform such that the activator plate is advanced distally into the interior recess to a distal position disengaged from the anvil head to permit the anvil head to pivot about the pivot axis in response to movement of the plunger while the securing member is moved distally to securely engage the post extending from the anvil head to maintain the activator plate in the distal position.

2. The surgical fastening apparatus of claim 1, wherein the post defines an annular groove configured to securely receive the securing member.

3. The surgical fastening apparatus of claim 1, wherein the post defines an aperture therethrough, the aperture configured to align with a throughbore of the anvil center rod assembly.

4. The surgical fastening apparatus of claim 3, wherein the aperture and the throughbore are configured to receive a pivot member therethrough to pivotably attach the anvil head assembly with the anvil center rod assembly.

5. The surgical fastening apparatus of claim 1, wherein the deformable member includes a body and an extension extending therefrom.

6. The surgical fastening apparatus of claim 5, wherein the extension is configured to deform with respect to the body.

7. The surgical fastening apparatus of claim 1, wherein the pivot axis is transverse to the longitudinal axis.

8. The surgical fastening apparatus of claim 1, wherein the plunger is configured to engage the anvil head assembly at a location offset from the longitudinal axis.

9. The surgical fastening apparatus of claim 1, wherein the anvil head assembly includes a cut ring disposed in the interior recess.

10. The surgical fastening apparatus of claim 9, wherein the cut ring is configured to receive an annular knife upon the actuation of the handle assembly.

11. The surgical fastening apparatus of claim 1, wherein the anvil center rod assembly defines a ridge configured to inhibit the anvil head from pivoting about the pivot axis.

12. The surgical fastening apparatus of claim 11, wherein the ridge is configured to engage a lug extending from the activator plate.

13. The surgical fastening apparatus of claim 11, wherein, upon actuation of the handle assembly, the lug is configured to move away from the ridge to permit pivoting of the anvil head about the pivot axis.

14. The surgical fastening apparatus of claim 1, wherein the anvil center rod assembly includes a sleeve slidably disposed thereon.

15. The surgical fastening apparatus of claim 14, wherein the sleeve is configured to engage tissue.

16. The surgical fastening apparatus of claim 15, wherein the sleeve is configured to slide proximally upon pivoting of the anvil head about the pivot axis.

17. The surgical fastening apparatus of claim 1, wherein the securing member includes a discontinuity defined by a pair of tapered ends.

18. A method of using a surgical fastening apparatus,
comprising:
providing an anvil center rod assembly and an anvil head
assembly pivotably attached thereto;
actuating the surgical fastening apparatus such that an 5
annular knife contacts a cut ring within the anvil head
assembly;
advancing the annular knife distally such that the cut ring
moves an activation plate and a deformable member
distally of the cut ring to cause release of the activation 10
plate from the anvil head assembly, the deformable
member having a body and an extension configured to
deform relative to the body; and
securing the activation plate with a securing ring to
maintain the activation plate released relative to the 15
anvil head assembly such that the anvil head assembly
is free to pivot relative to the anvil center rod assembly.
19. The method of claim 18, further including pivoting the
anvil head assembly relative to the anvil center rod assembly
such that a smaller cross-sectional profile of the surgical 20
fastening apparatus is created.

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